

## **REMARKS**

### **Introduction**

Claims 1 – 13 were originally pending in the PCT application to which this application claims priority. On September 8, 2000, in a paper submitted to the International Preliminary Examining Authority at the European Patent Office, new claims 1 – 12 were presented. In the response to a September 3, 2003 Office Action, dependent claims 13 and 14 were added to further define the invention. New independent claim 15 has been added by way of this Amendment to further define the invention. Accordingly, claims 1 – 15 are presently pending in this application.

### **Claim Rejection – 35 U.S.C. § 103**

Claims 1 – 14 were rejected under 35 U.S.C. § 103(a) as being unpatentable over European Patent No. 0528643 A1 to Swanepoel. Applicant respectfully traverses this rejection.

The Swanepoel reference discloses three examples of windscreen wiper backbones, listing the material properties and the dimensions of each. Using these examples, the Examiner calculated the upper limit of the width, thickness, width ratio, and thickness ratio according to the equations disclosed in claims 1 – 4 of the present application. These calculated upper limits were compared to the backbone width and thickness disclosed in the Swanepoel '643 A1 reference. The Examiner included three charts of comparisons in the February 13, 2004 Office Action. Comparing the backbone length listed in the Swanepoel reference to the backbone length listed in the charts, Applicant understands chart 1 to correlate to example 2 of the Swanepoel reference. Applicant also understands chart 2 to correlate to example 1 of the Swanepoel reference. Thus, Applicant assumes that chart 3 should correlate to example 3 of the Swanepoel reference. However, the length listed in

chart 3 is 476mm, when in fact the backbone length listed in the Swanepoel reference is 450mm. (See Swanepoel, page 7, line 36.) Thus, by correcting the backbone length for the calculations of example 3, the comparison for chart 3 is:

Swanepoel, Example 3 (L = 450)			
		Calculated (m m)	Actual (m m)
W		10.671	11
Ratio W		0.0237	0.0244
T		1.126	1.15
Ratio T		0.0025	0.0026

The other two comparison charts are reproduced below:

Swanepoel, Example 2 (L = 440)			
		Calculated (m m)	Actual (m m)
W		10.317	11
Ratio W		0.0234	0.025
T		1.119	1.15
Ratio T		0.0025	0.0026

Swanepoel, Example 1 (L = 450)			
		Calculated (m m)	Actual (m m)
W		10.67	11
Ratio W		0.0237	0.0244
T		1.1258	1.29
Ratio T		0.0025	0.00287

The three examples in the Swanepoel reference each disclose backbone dimensions different from those required by claims 1 – 4. However, the Examiner suggests that “since the actual and calculated values do vary, it would have been obvious to one of ordinary skill in the art, after routine experimentation, to find the optimum width and thickness of the backbone....” The Applicant for

the present case pending before the USPTO is the same inventor identified on the face of the Swanepoel '643 A1 reference. If the dimensional relationships expressed in claims 1 – 4 were obvious, then they would have been evident to Mr. Swanepoel at the time he made his earlier invention and therefore would have been expressed in the Swanepoel reference. The fact that the Swanepoel '643 A1 reference teaches wiper backbone dimensions that are different than those claimed in the present application is evidence of their nonobviousness. Indeed, it took almost ten more years from the time of filing the Swanepoel '643 A1 reference to further research and develop the wipers of claims 1 – 4 of the present application. This fact is strong evidence of the nonobviousness of those claims.

The Examiner also suggests that the difference between the calculated dimensions and the actual dimensions shown in the charts “is considered to be acceptable.” The Examiner points to the word “substantially” used in claims 1 – 4 and states “actual values vary from the calculated because the calculated values are not necessarily at the widest or thickest point but at *substantially* the widest and thickest points.” Applicant must respectfully disagree. The Examiner has provided no basis for these conclusions.

In reality, the differences between the wiper examples of the Swanepoel reference and the wipers of claims 1 – 4 are, in fact, quite significant. The maximum width and thickness dimensions dramatically affect the vertical and lateral stiffness of the backbone. Vertical stiffness is the backbone’s bending stiffness in its plane of curvature and lateral stiffness is the backbone’s the backbone’s bending stiffness in its wiping direction. The lateral and vertical stiffness characteristics ultimately determine the wiper’s performance. Therefore, the dimensional differences between the wiper examples of the Swanepoel reference and the wipers of claims 1 – 4 affect the wiper

performance significantly as discussed in greater detail below. The following equations are used to determine vertical and lateral stiffness of the wipers.

$$VerticalStiffness = \frac{W T^3 E}{12} \quad Lateral\ Stiffness = \frac{W^3 T E}{12}$$

(Where W is backbone width, T is backbone thickness, and E is the Young's Modulus.)

It is important to note that the vertical stiffness is a function to the third power of the backbone's thickness and is also proportional to its width. Thus, even a slight difference in backbone thickness has a significant impact on vertical stiffness of the backbone. Likewise, the lateral stiffness is a function of the third power of the backbone width and is proportional to the thickness. Thus, even a slight difference in backbone width has a significant impact on lateral stiffness of the backbone. Again, the vertical stiffness and the lateral stiffness are main factors that determine wiping performance.

The equations listed above can be used to show the difference in stiffness between the claimed wipers and the examples listed in the Swanepoel reference. Using example 2 of the Swanepoel reference, the difference in lateral stiffness can be calculated as follows:

$$Lateral\ Stiffness\ Difference = \left( \frac{(1/12)(W_{actual})^3(T)E}{(1/12)(W_{calc})^3(T)E} - 1 \right) \times 100$$

Because variables T and E remain constant for our purposes, this equation can be simplified as follows:

$$Lateral\ Stiffness\ Difference = \left( \frac{(W_{actual})^3}{(W_{calc})^3} - 1 \right) \times 100$$

Using this final equation, we compute the difference in lateral stiffness for Example 2 of the Swanepoel reference as:

$$Lateral\ Stiffness\ Difference = \left( \frac{(11)^3}{(10.317)^3} - 1 \right) \times 100 = 21\%$$

The vertical stiffness difference can also be computed for Example 2 as follows:

$$Vertical\ Stiffness\ Difference = \left( \frac{(1/12)(W)(T_{actual})^3 E}{(1/12)(W)(T_{calc})^3 E} - 1 \right) \times 100 =$$

$$\left( \frac{(T_{actual})^3}{(T_{calc})^3} - 1 \right) \times 100 = \left( \frac{(1.15)^3}{(1.119)^3} - 1 \right) \times 100 = 9\%$$

As shown by these equations, because of the differences in width and thickness, the wiper of Example 2 of the Swanepoel reference is 21% more stiff laterally and 9% more stiff vertically in

comparison with the claimed wipers. These differences cannot be deemed “minimal” when in fact the stiffness of the wipers ultimately determines their wiping performance.

Similar calculations for each of the examples is shown in the following charts:

Swanepoel, Example 3 (L=450)			
	Calculated (mm)	Actual (mm)	Difference in Stiffness (%)
W	10.67	11	(lateral) 10%
Ratio W	0.0237	0.0244	
T	1.1258	1.15	(vertical) 7%
Ratio T	0.0025	0.0026	

Swanepoel, Example 2 (L=440)			
	Calculated (mm)	Actual (mm)	Difference in Stiffness (%)
W	10.317	11	(lateral) 21%
Ratio W	0.0234	0.025	
T	1.119	1.15	(vertical) 9%
Ratio T	0.0025	0.0026	

Swanepoel, Example 1 (L=450)			
	Calculated (mm)	Actual (mm)	Difference in Stiffness (%)
W	10.67	11	(lateral) 10%
Ratio W	0.0237	0.0244	
T	1.1258	1.29	(vertical) 50%
Ratio T	0.0025	0.00287	

Thus, the difference in dimensions between the width and thickness of the Swanepoel ‘643 A1 examples and the wipers of claims 1 – 4 has a significant effect on the stiffness of the wipers, and stiffness of the wipers ultimately determines their wiping performance.

In view of the above, the Applicant respectfully submits that the dimensional difference between the wipers of the Swanepoel reference and the wipers of claims 1 – 4 cannot be deemed “minimal.” Furthermore, the Applicant respectfully submits that the Swanepoel ‘643 A1 reference

neither discloses nor suggests the wipers disclosed in claims 1 – 4 of the present application.

Accordingly, Applicant respectfully requests reconsideration of the rejection of claims 1 – 4.

**New Claim**

Claim 15 has been added to further define the invention. Claim 15 combines the limitations of claims 1 and 3. The difference in stiffness between the Swanepoel examples and the claimed wipers was calculated with the following equations:

$$\text{Lateral Stiffness Difference} = \left( \frac{(1/12)(W_{actual})^3 (T_{actual})E}{(1/12)(W_{calc})^3 (T_{calc})E} - 1 \right) \times 100$$

$$\text{Vertical Stiffness Difference} = \left( \frac{(1/12)(W_{actual})(T_{actual})^3 E}{(1/12)(W_{calc})(T_{calc})^3 E} - 1 \right) \times 100$$

The following charts show the stiffness difference between the Swanepoel examples and the claimed wipers:

Swanepoel, Example 3 (L=450)			
	Calculated (mm)	Actual (mm)	Difference in Beam Stiffness (%)
W	10.67	11	(Lateral) 12 %
T	1.1258	1.15	(Vertical) 10 %

Swanepoel, Example 2 (L=440)			
	Calculated (mm)	Actual (mm)	Difference in Beam Stiffness (%)
W	10.317	11	(Lateral) 25 %
T	1.119	1.15	(Vertical) 16 %

Swanepoel, Example 1 (L=450)			
	Calculated (mm)	Actual (mm)	Difference in Beam Stiffness (%)
W	10.67	11	(Lateral) 26 %
T	1.1258	1.29	(Vertical) 55 %

Lateral and vertical stiffness of the wipers each ultimately determine the performance of the wipers. Given the difference in stiffness between the wiper of new claim 15 and the wipers described in the earlier Swanepoel '643 A1 reference, Applicant respectfully submits that the Swanepoel '643 A1 reference neither discloses nor suggests claim 15. Accordingly, Applicant respectfully solicits allowance of new claim 15.

### **Conclusion**

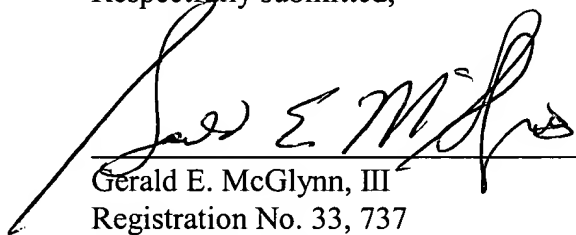
Applicant respectfully traverses the rejections of claims 1 – 4 for reasons set forth above. Furthermore, claims 5-14 are all ultimately dependent upon one of independent claims 1 – 4 and add further perfecting limitations. By way of this Amendment, Applicant also added claim 15 to this



application. Claim 15 have been drafted with a view toward the Examiner's earlier comments and serve to further distinguish the present invention over the prior art. Applicant respectfully submits that the Swanepoel '643 A1 reference neither discloses nor suggests the wipers of claims 1 - 15. However, and even if it did, this reference could only be applied through hindsight after restructuring the disclosures of the prior art in view of the applicant's invention. Accordingly, Applicant respectfully solicits the allowance of claims 1 - 15.

Finally, if the examiner has any questions or would like to discuss any of the matters set forth above, the Examiner is encouraged to contact undersigned counsel at the telephone number indicated below.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "Gerald E. McGlynn, III", is written over a horizontal line.

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